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How Financial Markets Affect Long-Run Growth

A Cross-Country Study

Ejaz Ghani

A country with a more developed financial system tends to grow faster because it can make more efficient use of resources. Policy reform that fosters financial development also fosters a better growth rate for real GDP.

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This paper — a product of the Country Operations Division, Eastern Africa Department, Africa Regional Office and initiated while the author was in Division II, Country Policy, Industry and Finance, Operations Evaluation Department — is part of a review of cross-country experience with long-term growth. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Afsar Nokhostin, room J10-285, extension 34150 (30 pages). January 1992.

Empirical studies on new growth theory have tended to ignore financial policy's role in development. Ghani provides evidence that the initial level of financial development is positively associated with a country's later GDP growth rate, after controlling for the effect of the starting value of human capital and the investment rate.

A country that starts with a more developed financial system tends to grow faster because it can make more efficient use of resources. It can do so through several channels, including better evaluation and monitoring of firms, lower transaction costs for financial intermediation, and externalities generated from information collected and processed in financial markets.

Policy reform that fosters financial development also has a significant positive effect on the growth rate of real GDP. The empirical evidence Ghani presents for 50 developing countries tends to reinforce a classical theme of development economics: the importance of human capital and financial markets.

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How Financial Markets Affect Long-Run Growth: A Cross-Country Study

by
Ejaz Ghani

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Ejaz Ghani[1]

1. Introduction

What determines growth and how economic policy can influence growth is one of the oldest questions in development economics. The traditional neo-classical growth models predict that a country's per capita growth rate is inversely related to its initial level of income per person and that the output growth rate is determined by exogenously given technological changes [see, Solow (1956), Kaldor (1957), Cass (1965), Koopmans (1965)]. The inverse relationship between a country's growth rate and its initial level of income implies that, in the long-run, levels of per capita income would converge across countries. The main argument for this is the diminishing returns to capital. Poor countries, with a low ratio of capital to labor, have high marginal products of capital and thereby tend to grow at a faster rate. With regard to technological change, the traditional models argue that it is influenced by non-economic variables such as scientific factors rather than economic policy, i.e., it is exogenously given. Both these predictions have been challenged by recent developments in growth theory, starting with the work of Romer (1986), Lucas (1988) and Barro (1991), that highlight the importance of the positive feedback from initial conditions and the policy environment to a country's subsequent growth rate. First, evidence shows that income levels have not converged across countries [see Barro (1991) and Baumol (1986)]. Figure 1 shows the cross-country evidence for a sample of fifty

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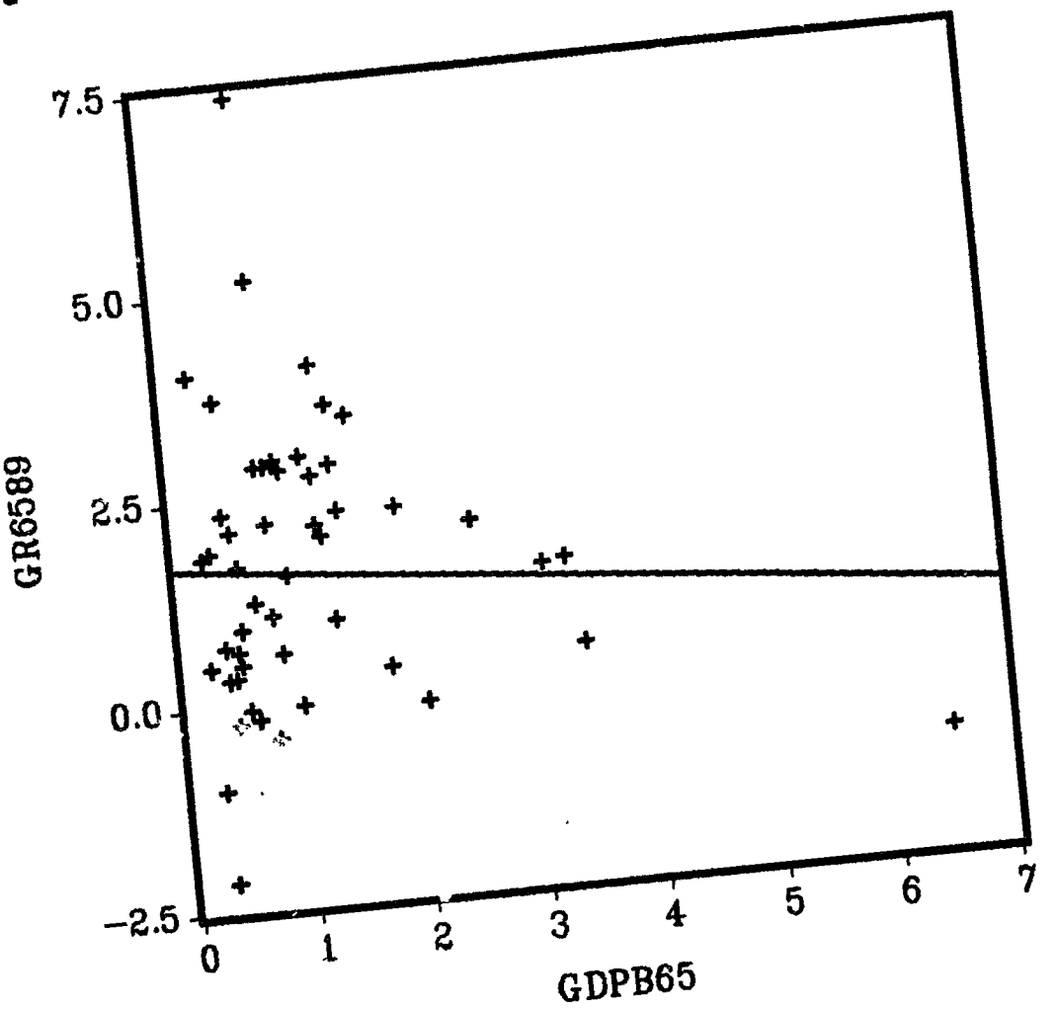
[1] I am grateful to Sanliang Yue and Meiyue Cheng for research assistance; F. Louat for data on human capital stock; M. Baird, S. Bhalla, W. Branson, W. Easterly, S. Fries, A. Harrison, C. Kilby, A. Mahmood, P. Miovic, L. Summers, and in particular R. Levine, for helpful discussions and/or comments.

Figure 1: Per Capita GDP Growth Rate & 1965 GDP Per Capita



two developing countries which suggests that per capita growth rates are not correlated with the initial level of per capita GDP. The average growth rate of per capita real GDP for the period 1965 to 1989 (GR6589) is not significantly related to the 1965 value of real per capita GDP (GDPB65). Second, recent developments in the growth theory suggest that the source of non-convergence is related to the initial conditions and the policy environment, i.e., technological changes are endogenous.[2] Barro (1991) provides cross-country evidence that highlight the importance of the initial stock of human capital to long-run growth, i.e., a country which starts with a higher level of human capital stock tends to grow faster. The main reason for the positive feedback from the starting value of human capital stock to a country's subsequent growth rate is that a larger stock of human capital makes it easier for a country to generate new ideas [Romer (1990), Sah and Stiglitz (1990)] and/or absorb new ideas that have been discovered elsewhere [Nelson and Phelps (1966), Stewart and Ghani (1991)]. This paper explores other dimensions of the initial conditions, such as the level of development of the markets, that may influence a country's subsequent growth rate. In particular, this paper assesses whether the <u>initial</u> level of financial development has a positive feedback on a country's subsequent growth rate.[3] The hypothesis here is that a country which starts with an underdeveloped financial market would

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[2] The new growth theories have extended the traditional models by endogenizing technological change and, thus, recognize the role of initial conditions and economic policy in development. Lucas (1988), for example, makes technological change endogenous by emphasizing externalities associated with human capital. Investment in human capital by an individual increases not only her/his own output but also increases the productivity of others. Externalities generated from human capital produce an aggregate production function that has increasing returns to scale. Resources that are invested in human capital accumulation, therefore, generate long-run steady growth rate.

[3] Several empirical studies have examined the link between financial development and growth, however, these studies were not motivated by the new growth theory [see Branson and Schwartz (1989), A. Gelb (1988), Fry (1988), Jung (1986) and Neal (1988)]. Moreover, they have not assessed the importance of financial policy in relation to other economic policies. It is important to examine the effects of different policies simultaneously since the adverse effects of one set of policies on growth may be offset by other policies.

tend to grow at a slower rate in comparison to countries that begin with a more developed financial market , other things remaining constant. This is because underdeveloped financial markets are usually characterized by poor ability to allocate and manage capital efficiently: screening different investment opportunities for those most likely to yield high returns, monitoring firms in a way to ensure that they live up to their potentials, for example [see Greenwood and Jovanovic (1990), Townsend (1983), Stiglitz (1991)]. The literature on financial markets and growth is extensive, starting with the work of Goldsmith (1969), McKinnon (1973), and Shaw (1973). Goldsmith (1969) argued that financial development "accelerates economic growth and improves economic performance to the extent that it facilities the migration of funds to the best user, i.e., to the place in the economic system where the funds will yield the highest social return" [p.400].

This paper is organized as follows. Section 2 examines the relationship between policy and development of financial markets in some fifty developing countries using annual average data for the period 1965 to 1989. Simple correlations confirm that repressive financial policies are associated with shallow financial markets and limited financial intermediation. Section 3 reports estimates of cross-country long-run growth regressions. The evidence suggests that the initial level of financial development and the starting value of human capital stock are both positive and individually significant in explaining a country's subsequent growth rate. Since initial conditions ignore policy changes over time, section 4 examines the link between policy change and growth. Again, the evidence shows that policy reforms that foster financial development are positively associated with output growth. The robustness of the result is tested in several ways including its sensitivity to changes in time period and use of alternative indicators of financial development. The sensitivity results reinforce the evidence that a country which starts with a more developed financial market and fosters financial

development tends to grow faster. Section 5 concludes.

2. Indicators of Financial Policy and Financial Development

This section reviews the quantitative measures used to capture financial policy distortions as well as indicators of financial market development. Policies that distort or repress financial markets typically include both price and quantity restrictions [see World Development Report (1989) for a recent review]. Thy include real interest rate, commercial banks' reserves with the central bank, and other measures that influence the distribution of credit between the public and the private sector. The effects of negative and artificially low real interest rates on the behavior and development of financial markets have been well documented in the literature. Policies aimed at increasing the commercial banks' reserves with the central bank, which can act as an implicit tax on deposits when reserves earn a rate below that offered by the market, have been relatively less emphasized. Indicators of the financial market development include the structure of the financial system, the depth and size of the financial market and the extent of financial intermediation. The structure of the financial system is proxied in this paper by the ratio of central bank assets to total assets of the financial system. It is expected that the ratio of the central bank's assets relative to the assets of the financial system would be smaller in more developed financial markets; this ratio would be inversely related to the importance of other financial institutions (e.g. deposit banks) in the system.[4] Fifty two developing countries, for which data are available for the period 1965-89, were included in the sample.[5] Developed countries were not included as this might accentuate the restriction that economic structures and institutions are similar across the developed and the developing

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[4] See Appendix 2 on mean and standard deviation of financial variables.

[5] Countries included in the sample are listed in Appendix III; they are listed in alphabetical order in the data set.

Table 1: Cross-Country correlations on Long-run Indicators of Financial Activity in Developing countries (1965-89)

	r6589	BSRCB6589	CPY6589	CGY6589	CBAFA6589	FIY6589	M3Y6589
r6589	1.00	-0.35	0.48	-0.24	-0.43	0.31	0.28
BSRCB6589		1.00	-0.09	0.14	0.31	0.06	-0.17
CPY6589			1.00	0.06	-0.33	0.60	0.72
CGY6589				1.00	0.23	0.20	0.35
CBAFA6589					1.00	-0.47	-0.47
FIY6589						1.00	0.75
M3Y6589							1.00

Notes:
Number of countries: 52 (see Appendix 3 for the list of countries).

Definition of variables: (Appendix 1 for data sources)
All values are annual average figures for the period 1965-89
r: Real interest rate.
BSRCB: The ratio of commercial bank reserves with the Central Bank to total assets of the financial system.
CPY: The ratio of credit to the private sector to GDP.
CGY: The ratio of credit to the government sector to GDP.
CBAFA: The ratio of Central Bank assets to total assets of the financial system.
FIY: Financial intermediation as a ratio of GDP.
M3Y: The ratio of total assets of the financial system to GDP.

Figure 2: Financial Deepening & Real Interest Rate in Developing Countries
1965–89

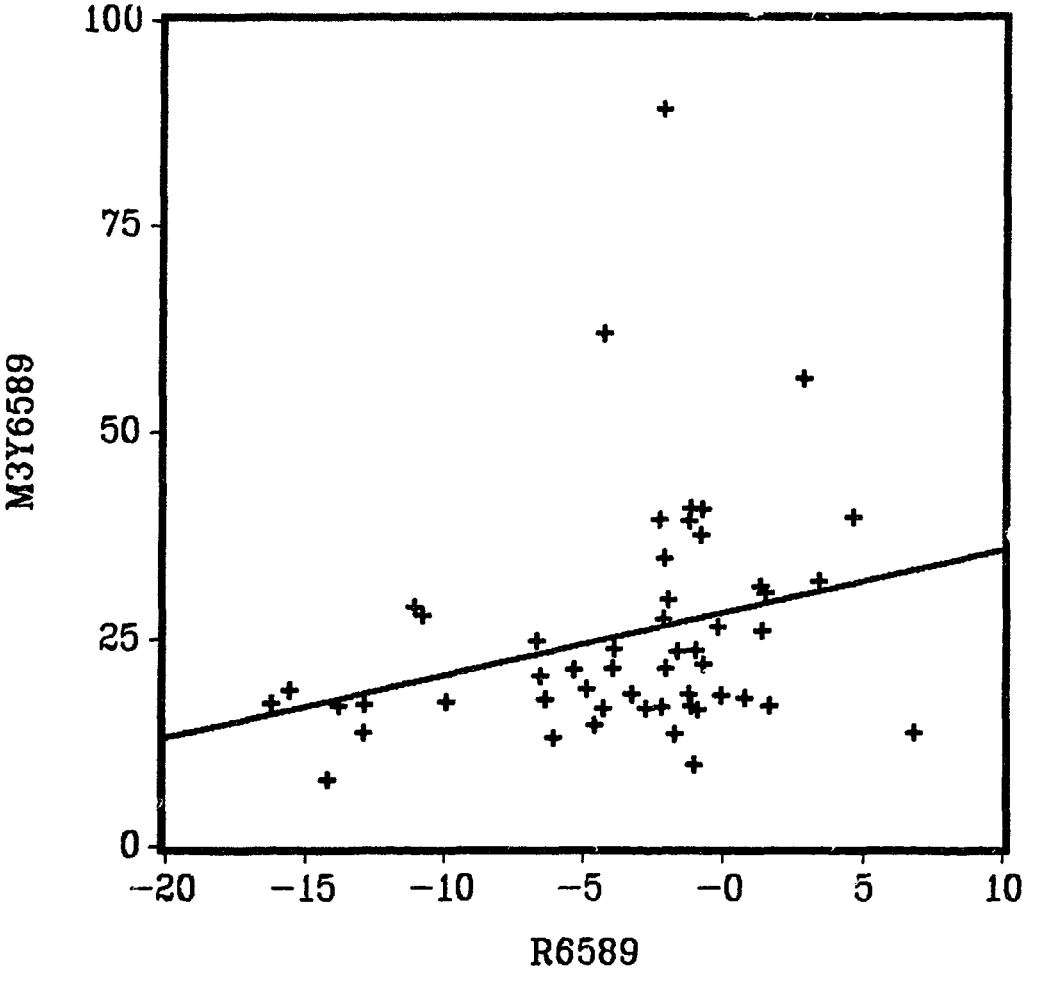
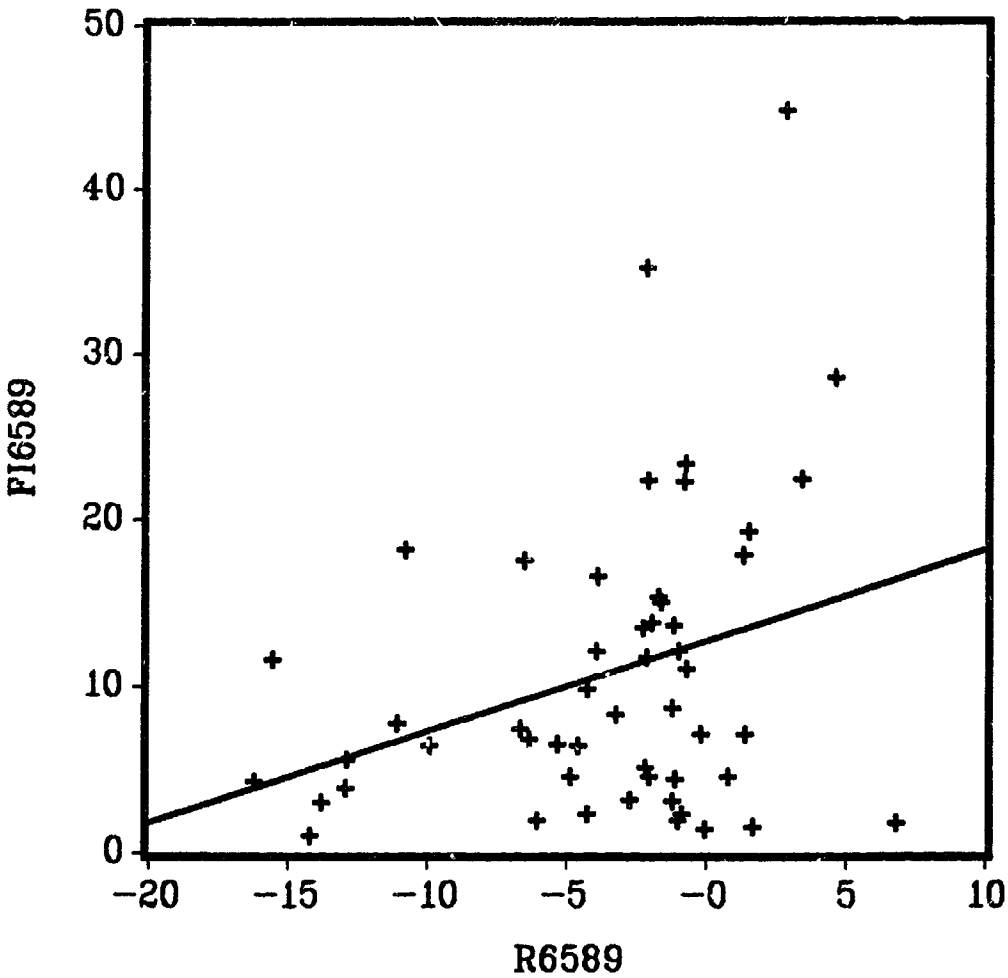


Figure 3: Financial Intermediation and Real Interest Rate
1965–89



countries [see Stern (1991)] [6].

Table 1 reports simple cross-country correlations between different measures of financial policy; it also reports correlations between indicators of financial policy and financial market development. The data used are period averages for 1965-89. The table shows that the simple correlation between the average real interest rate for the period 1965-89 (denoted by r6589) and the average ratio of total assets of the financial institutions to GDP for the period 1965-89 is positive (denoted by M3Y6589); the correlation is + 0.28. Figure 2 shows the positive association between real interest rate and financial deepening for the sample of developing countries. Korea and Malaysia are examples of countries that maintained positive real interest rates between 2 to 3 percent per annum and experienced substantial monetary deepening between 1965 to 1989. In contrast, Somalia and Zaire had negative real interest rates, averaging some -14% per annum, and have shallow financial markets. Bolivia and Peru are examples of Latin American countries that lack financial depth as a result of negative real interest rates in the past.

Table 1 shows that the correlation between average real interest rate and financial intermediation to GDP ratio (FIY6589) is also positive, +0.31. Figure 3 shows the relationship between these two variables; it shows that a majority of countries maintained low and negative real interest rates (3 to 4% per annum) resulting in limited financial intermediation (10 to 15% as a ratio of GDP). With regard to the distribution of credit, evidence shows that the real interest rate is positively correlated with credit to the private sector (CPY6589), +0.48, and negatively associated with credit to the public sector (CGY6589), -0.24. This is consistent with the finding that artificially low and negative real interest rates reduce the extent of capital allocation

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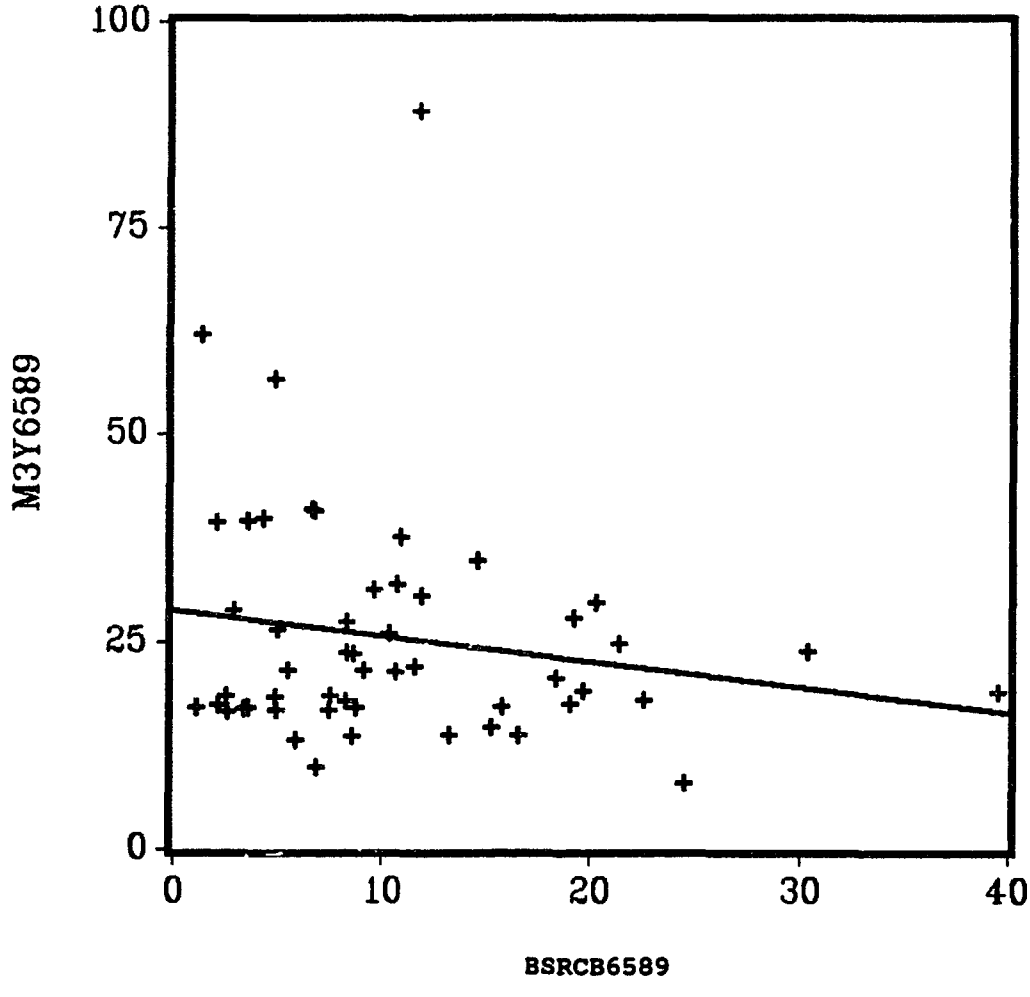
[6] It has been argued, though, that it can be difficult to draw the line between the developed and developing countries.

Figure 4: Financial Deepening & Reserve Requirements
1965–89



through the market mechanism.[7] The long-run historical data, thus, confirm that the interest rate policy influences the development of the financial markets.

Another indicator of repressive financial policy is the requirement that commercial bank's hold reserves with the central bank; often this amounts to forced borrowing by the government through non-market mechanisms. Data shows that the average ratio of commercial banks' reserves with the central bank as a ratio of total assets of the financial institutions (BSRCB6589) is positively correlated with credit to the public sector, +0.14, and negatively correlated with credit to the private sector credit, -0.09.[8] The adverse impact of high reserve requirements on financial market development is further confirmed by the negative correlation between BSRCB6589 and financial deepening, -0.17.[9] Figure 4 depicts the negative relationship between financial deepening and commercial banks' reserves with the central bank. On average, commercial banks' reserves with the central bank amounted to some 10% of the totoal assets of the financial institutions for the period 1965-89.

The evidence on the correlation between the size of the central bank relative to the financial system, CBAFA6589, is consistent with other indicators of financial development. Figure 5 shows that financial deepening is inversely related to the size of the central bank in the financial system. Figure 6 shows the negative association between financial intermediation and the relative size of the central bank.

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[7] Notice, interest rate liberalization can conflict with fiscal stabilization in the short-run; on the other hand, fiscal deficits can contribute to financial crowding-out of the private sector.

[8] The relationship between distribution of credit and financial development is not clear cut. Both private sector credit and government credit are positively correlated with improved financial intermediation and increased financial depth, although credit to private sector appears to be more closely associated with financial development.

[9] BSRCB6589, surprisingly, appears to be positively associated with financial intermediation; the magnitude of the correlation coefficient, however, is small.

Figure 5: Financial Deepening & Structure of the Financial System 1965–89

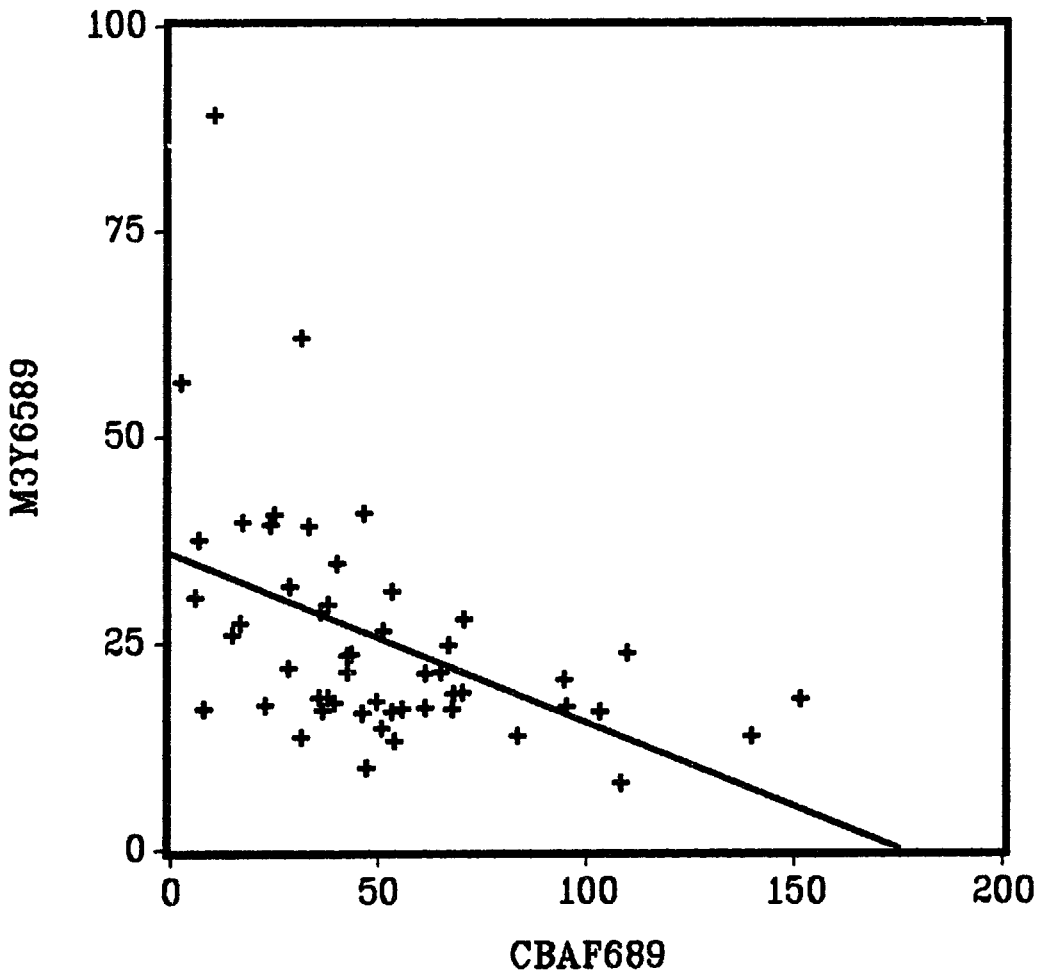

Figure 6: Financial Intermediation & Structure of the Financial System 1965–89

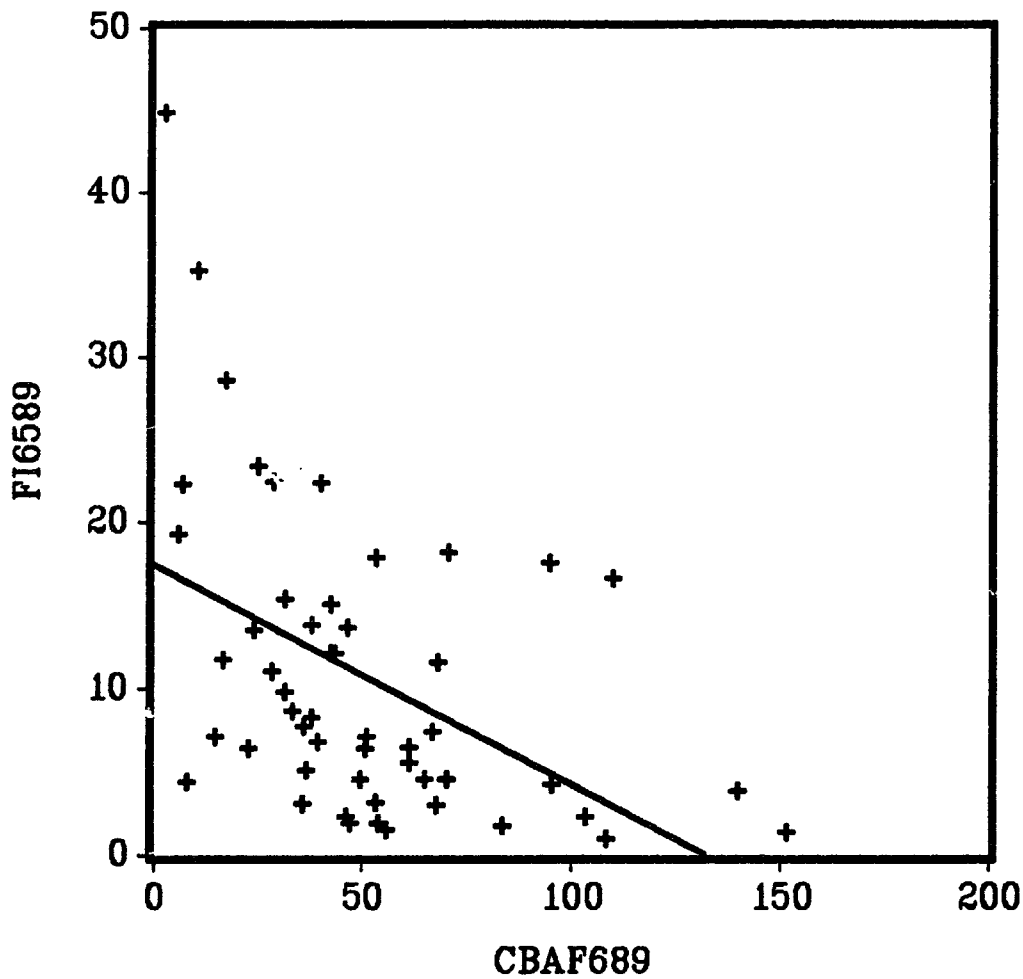

Table 1 shows that the correlation between the size of the central bank and private sector credit is negative, -0.33; it can reflect other restrictive policies that inhibit the development of the financial sector. In conclusion, indicators of financial policy and financial development appear to be mutually consistent; they also highlight that policy can have an important influence on the development of financial markets.

3. Financial Markets and Growth

This section reports the estimates of cross-country growth regressions. Unlike some of the previous studies, the country sample was not changed while estimating the growth impact of different policies; changes in the country sample make it difficult to assess whether the change in the sign and the magnitude of the explanatory variable arise from the introduction of new variables or the change in sample size. The dependent variable is average real GDP growth rate per capita for the period 1965-89 and the explanatory variables include measures of initial conditions, factor inputs, and long-run averages of economic policy. The use of long-run average is aimed at minimizing reverse causality. Initial conditions include the starting value of the level of financial development, human capital stock, and real GDP per capita in 1965. The initial level of financial development is given by the ratio of total assets of the financial institutions to GDP. The initial level of human capital stock is given by the years of schooling of the total labor force [Louat (1991)]. The input variables include the average real investment rate and the growth in labor force. The policy variables include the inflation rate, budget deficit, black market exchange rate premium and trade share in GDP.[10] High inflation can have a negative

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[10] Previous cross-country regressions have identified more than 50 variables that are significant in growth equations. Most of these relationships, however, do not hold when omitted variables [e.g., investment share] are included in the regression [see, Levine and Renelt (1991)]. The variables that have been found to be robust include the investment rate, initial human capital stock and the initial level of real GDP per capita.

influence on the growth rate through a variety of mechanisms [see Fischer (1991)]. For example, it can reduce the efficiency of the exchange mechanism. Similarly, fiscal imbalances can give rise to uncertainty and crowd out private investment and thereby give rise to a negative association between budget deficits and growth. Since data on budget deficit are not available for the period 1965-89, the ratio of seigniorage revenue to GDP (defined as the change in central bank's claims on government to GDP in the same year) is used as a proxy for fiscal imbalance. This is a reasonable assumption since most developing countries monetized their budget deficits in the past [see, Edwards (1991b)]. Black market exchange rate premium over the official rate measures the degree of overvaluation of the currency and the coefficient on this variable is expected to be negative. Frequently, black market exchange rate premium is assumed as a measure of trade distortion [for example, see World Development Report 1991]. However, data shows that it is a poor proxy for trade restriction; the correlation between black market exchange rate premium and export to GDP ratio is small, -0.16.[11] Trade policy is proxied in this paper by the export (trade) to GDP ratio. Although export to GDP ratio is not a perfect measure of trade policy, it is preferred to other constructed measures that can suffer from subjective bias.[12] Moreover, the qualitative indices are not available for all the countries included in the regression analysis. With regard to the impact of trade policy, new growth theory does not predict that trade will unambiguously raise

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initial level of real GDP per capita.

[11] In comparison, the simple correlation between black market premium and the real interest rate is relatively large, -0.33; suggesting that an increase in the domestic real interest rate (relative to the rest of the world) is associated with a lower black market exchange rate premium.

[12] Edwards(1991a) used Leamer's trade policy measure, given by the difference between actual and predicted trade, in growth regression. Leamer's measure, however, is not a good indicator of trade policy since it is negatively correlated with several other measures of trade openness, e.g., tariff levels, the extent of non-tariff barriers, import penetration [see Pritchett (1991)].

Table 2: Initial Conditions, Policy and Long-run Growth, 1965-89

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Var.	GR6589	GR6589	GR6589	GR6589	GR6589	GR7089
GDP65	-1.038	-1.308	-1.288	-1.295	-1.2?	-1.327
	(0.44)*	(0.646)*	(0.426)*	(0.419)*	(0.414)*	(0.488)*
HKS65	0.396	0.420	0.365	0.436	0.397	0.479
	(0.159)*	(0.165)*	(0.171)*	(0.159)*	(0.165)*	(0.179)*
M3Y65	0.037	-----	0.038	0.037	0.038	0.040
	(0.019)*		(0.021)*	(0.019)*	(0.018)*	(0.021)*
CPY65	-----	0.054	------	-----	------	------
		(0.030)*				
CGY65	-----	-0.003	------	-----	------	------
	-----	(0.024)				
IY6589	------	------	0.077	0.061	0.06	0.049
			(0.033)*	(0.022)*	(0.023)*	(0.027)*
GP6589	------	------	-0.467	------	------	-----
			(0.466)			
XY6589	------	------	0.001	-----	------	-----
			(0.022)			
INFL6589	------	------	0.0004	------	------	-----
			(0.011)			
SEGRY6589	------	------	-0.286	-0.258	-0.217	-0.328
			(0.131)*	(0.088)*	(0.096)*	(0.097)*
BMP6589	------	------	-0.0004	------	------	-----
			(0.002)			
DA	-1.202	-1.48	-1.017	-1.092	-0.982	-1.137
	(0.576)*	(0.584)*	(0.528)*	(0.481)*	(0.485)*	(0.607)*
DLA	-0.152	-0.303	0.567	0.652	0.581	0.629
	(0.70)	(0.584)	(0.814)	(0.743)	(0.798)	(0.843)
DR	-----	-----	-----	------	0.641	
					(0.623)	
BSRCB6589	-----	-----	-----	-----	0.003	
					(0.035)	
C	0.206	0.195	0.008	-1.050	-0.538	-0.983
	(0.662)	(0.747)	(1.237)	(0.822)	(0.982)	(0.990)
Adj. R2	0.292	0.287	0.391	0.426	0.417	0.378
S.E.R	1.469	1.474	1.363	1.323	1.333	1.535
Obser.	52	52	52	52	52	52

Notes: Coefficients in parentheses are the standard errors of the coefficients; * shows the significance of the coefficient at the 5% level; SER is the standard error of regression.

Definition of variables: **GR6589** (GR7089) is the annual average real GDP per capita growth rate for the period 1965-89 (1970-89); **GDP65** is the log of real GDP per capita in 1965; **HKS65** is the estimated years of schooling in 1965; **M3Y65** is the ratio of total assets of the financial system to GDP in 1965; **CPY65** is the ratio of private sector credit to GDP in 1965; **CGY65** is the average ratio of government credit to GDP in 1965; **IY6589** is the average ratio of real investment to GDP for the period 1965-89; **XY6589** is the average ratio of export to GDP for 1965-89; **INFL6589** is the annual average inflation rate for 1965-89; **SEGRY6589** is the average ratio of seignorage revenue to GDP (defined as the change in claims of the central bank on government to GDP in the same year) for 1965-89; **BMP6589** is the average black market exchange rate premium over the official rate for 1965-89; **DA** and **DLA** are dummy variables for Africa & Latin America; **DR** is dummy variable for real interest rate (1 for positive and 0 for negative); **BRCB6589** is the average ratio of commercial banks' reserves with the central bank to total financial assets for 1965-89.

economic growth. On the one hand, openness to trade can increase growth by improving the access to imported inputs --which embody new technology-- and by increasing the size of markets facing producers. On the other hand, growth can be adversely affected by reductions in R&D expenditure, resulting from increased import competition and the fall in expected profits.

Table 2 reports the estimates of the cross-country growth regressions. Because heteroskedasticity could be important across countries, the standard errors of the coefficients are based on White's [1980] heteroskedasticity-consistent covariance matrix.[13] Column (1) shows that the estimated coefficients on the human capital stock in 1965, HKS65, and the level of financial development in 1965, M3Y65, are positive and individually significant from zero at the 5% level.[14] The significance of the initial stock of human capital is consistent with other findings that emphasize human capital as an input in the growth process [Barro (1991), Romer (1986)]. A greater stock of initial human capital makes it easier for a country to adapt/absorb new products and ideas and thereby it tends to grow faster [see Nelson and Phelps (1966)]. Given the human capital, a country which starts with a more developed financial market also tends to grow faster. The coefficient on the initial level of real GDP per capita, GDP65, is negative and significant at the five percent level. This is consistent with the convergence hypothesis of neoclassical growth models, i.e., poorer countries tend to grow faster other things remaining unchanged.

Equation (2) examines the sensitivity of the regression to alternative measures of financial development. M3Y65 is replaced by the ratio of private sector credit to GDP in 1965, CPY65, and government

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[13] Simple OLS estimates produce similar results.

[14] The simple correlation between HKS65 and M3Y65 is, +0.24.

sector credit to GDP in 1965, CGY65. The coefficient on CPY65 is positive and significant at 5% level; the coefficient on CGY65 is not. The fit of equation (2) is close to that of equation (1), and the coefficient on HKS65 remains significant and positive.

Equation (3) reports the estimate of the general equation that includes investment rate, growth of population (as a proxy for growth of labor force), macroeconomic policy and trade policy. The coefficient on M3Y65 remains significant after controlling for the investment ratio; moreover, the coefficient on M3Y65 does not change much. This implies that the financial development has growth effects that are different from the investment channel. The coefficient on the real investment rate is positive and significant. The coefficient on the population growth rate, +0.533, is not significantly different from zero.[15] The coefficients on the trade variable, inflation rate and black market exchange rate premium are not significantly different from zero. The coefficient on seignorage revenue, as a proxy for fiscal deficit, is negative and significant, -0.286; suggesting that a higher level of monetization of the budget deficit is negatively associated with the long-run growth rate. The coefficient on the continent dummy variable for Latin America, DLA, is not significantly different from zero. This is an improvement on earlier studies which find this variable to be significant and negative [e.g., Barro (1991), Fischer (1991)]. A possible explanation is that the earlier studies did not include a financial policy variable in the growth equation. The coefficient on the African dummy variable (DA), however, remains significant and negative.[16]

Equation (4) excludes those variables that are not significant in equation (3). The sign and magnitude of the coefficients on the remaining

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[15] The significance of the this variable did not change when per capita growth rate is replaced with GDP growth rate as the dependent variable in equation (3).

[16] The coefficient on the African dummy variable becomes insignificant, when policy changes are included in growth equation, see the next section.

variables do not change much except for a reduction in the magnitude of the coefficient on the investment to GDP ratio. The coefficient on the investment rate fell from +0.077 to +0.061, although its t-statistic increased from 2.35 to 2.84. The improvement in the overall fit of the equation is reflected in the increase in adjusted R2 from 0.391 to 0.426.

Besides the initial level of financial development, long-run financial policy can also influence growth. Equation (5) includes two measures of financial policy in the growth regression: a dummy variable for real interest rate (1 for positive and 0 for negative) and the average ratio of commercial banks' reserves with the central bank to total financial assets. The coefficient on real interest rate, DR, is positive but not significantly different from zero. The coefficient on the reserve variable is also not significantly different from zero and the coefficient has the wrong sign.

Equation (6) tests for the sensitivity of the regression to changes in the time period. The dependent variable, GR6589, is replaced with the average real growth rate for the period 1970-89, GR7089, in equation (6). This introduces a five year lag on the right hand side variables. This did not change the result.

4. Policy Change and Growth

A drawback in using initial conditions and long-run averages is that it ignores policy changes over time, i.e., it does not take into account the growth impact of policy reforms. A large number of developing countries carried out policy reforms as part of their adjustment program in the 1980s; this may have influenced their output growth rates.

Table 3 reports the estimates of growth regressions that include policy changes as additional explanatory variables in the base equations reported in Table 2. Change is measured as the difference between the average annual figure for the last six years and the first six years of

Table 3: Policy Change and Growth in Developing Countries

	(1)	(2)	(3)	(4)	(5)
Dep. Var.	GR6589	GR6589	GR6589	GR6589	GR6589
GDP65	-1.25	-1.259	-0.768	-0.836	-0.825
	(0.427)*	(0.42)*	(0.432)*	(0.458)*	(0.457)*
HKS65	0.40	0.441	0.478	0.445	0.856
	(0.168)*	(0.154)*	(0.165)*	(0.159)*	(0.428)*
M3Y65	0.041	0.044	0.041	0.039	0.083
	(0.021)*	(0.018)*	(0.014)*	(0.014)*	(0.040)*
IY6589	0.068	0.061	0.059	0.063	0.038
	(0.029)*	(0.021)*	(0.019)*	(0.019)*	(0.029)
SEGRY6589	-0.189	-0.235	-0.165	-0.142	-0.19
	(0.137)	(0.096)*	(0.087)*	(0.083)*	(0.101)*
DHKS	-0.087	-----	-----	-----	----
	(0.216)				
DXY	0.016	-----	-----	-----	----
	(0.032)				
DINF	-0.002	-----	-----	-----	----
	(0.004)				
DBMP	-0.0005	-0.0007	-0.0009	-0.0009	-0.0008
	(0.0005)	(0.0003)*	(0.0002)*	(0.0003)*	(0.0003)*
DBSRCB	-0.035	-0.034	-0.037	-----	-0.027
	(0.021)	(0.020)	(0.020)*		(0.019)
DCPY	------	-----	-----	0.026	----
				(0.015)	
DCGY	------	-----	-----	-0.012	----
				(0.019)	
M3Y6589*IY6589	------	-----	-----	-----	0.0004
					(0.0008)
M3Y65*HKS65	------	-----	-----	-----	-0.018
					(0.015)
DA	-0.70	-0.687	-----	-----	-----
	(0.458)	(0.0465)			
DLA	0.933	0.852	-----	-----	-----
	(0.778)	(0.0724)			
C	-1.290	-1.355	-1.545	-1.858	-2.073
	(0.774)	(0.715)*	(0.647)*	(0.745)*	(0.92)*
Adj. R2	0.441	0.468	0.434	0.42	0.433
S.E.R.	1.306	1.274	1.314	1.331	1.316
Obser.	52	52	52	52	52

Notes: Coefficients in parentheses are the standard errors of the coefficients; * shows the significance of the coefficient at the 5% level; SER is the standard error of regression.

Definition of variables: **GR6589** is the annual average real GDP per capita growth rate; **GDP65** is the log of real GDP per capita in 1965; **HKS65** is the estimated years of schooling in 1965; **M3Y65** is the ratio of total assets of the financial system to GDP in 1965; **IY6589** is the average ratio of real investment to GDP; **SEGRY6589** is the average ratio of seignorage revenue to GDP (defined as the change in claims of the central bank on government to GDP in the same year); **DHKS** is the change in human capital stock, **DXY** is the change in export to GDP ratio, **DINF** is the change in inflation rate, **DBMP** is the change in black market exchange rate premium; **DBSRCB** is the change in commercial banks' reserves with the central bank to total financial assets, **DCPY** is the change in private sector credit to GDP ratio, **DCGY** is the change in the government sector credit to GDP ratio, **M3Y6589*IY6589** is the interaction term between average financial development and investment rate; **M3Y65*HKS65** is the interaction term between initial financial development and human capital stock; **DA** and **DLA** are dummy variables for Africa & Latin America.

the sample period 1965-89 [see Easterly (1989), Romer (1989)]. Equation (1) reports the general equation. The coefficients on changes in export ratio, DXY, and inflation rate, DINF, have the right signs but they are not significantly different from zero. The coefficient on change in human capital stock, DHKS, is negative but not significantly different from zero. The coefficient on the change in black market exchange rate premium, DBMP, becomes significant in Table 3. The coefficient on DBMP is negative implying that a devaluation of the official exchange rate, that reduces the black market premium, improves the rate of growth of real GDP per capita. The coefficient on changes in commercial bank reserves with the central bank, DBSRCB, is significant at the 10% level suggesting that a reduction in reserve requirement is associated with improved growth performance. These two policy change variables appear to reduce the significance of the continent dummy variables in equation (1).

The coefficients on those variables that are not significant in equation (1) are restricted to zero in equation (2). This improves the explanatory power of the growth equation. The coefficient on DBMP in equation (2) is highly significant. Since the coefficients on DA and DLA are not significant, they were excluded from equation (3).

Equation (4) uses alternative measures of financial policy reform. Change in private sector credit, DCPY, and government credit, DCGY, are included as explanatory variables in place of DBSRCB. The coefficient on the change in private sector credit variable is positive and significant; this confirms that policy reforms aimed at improving the access of private sector to credit is positively associated with output growth. The coefficient on DCGY is negative but not significantly different from zero. Other indicators of financial policy reform included change in financial depth, DM3Y, and change in financial intermediation, DFI. The coefficients on the change in financial depth and financial intermediation were positive but they were significantly different from zero.

The effect of interaction terms are examined in equation (5). Two interaction terms were included: the product of long-run average financial depth and investment rate, M3Y6589*IY6589, and the product of initial level of financial development and human capital in 1965, M3Y65*HKS65. The coefficient on M3Y6589*IY6589 is positive but not significant. The coefficient on M3Y65*HKS65 is negative and not significantly different from zero. The product terms between average firancial policy and investment, and initial financial and human development do not appear to add to the explanatory power of the growth equation.

5. Conclusions

The existing empirical studies on the new growth theory have tended to ignore the role of financial policy in development. This paper provides evidence that the initial level of financial development is positively associated with a country's subsequent GDP growth rate, after controlling for the effect of the starting value of human capital and investment rate. A country which starts with a more developed financial system tends to grow faster because it is able to improve the efficiency of resource use. This can take place through several channels, for example, better evaluation and monitoring of firms, lower transaction costs in financial intermediation, and externalities generated from the collection and processing of information in financial markets. From an aggregate production function point of view, this implies that countries that start with a more developed financial system are able to transform a given amount of inputs, K, into a larger amount of output, Y. Given the initial level of financial development and human capital stock, subsequent growth rate is found to be significantly and negatively related to the initial level of per capita GDP. This is consistent with the convergence hypothesis of neoclassical growth models. Policy reforms that foster financial development also have a positive and significant effect on the rate of growth of real GDP. The empirical evidence for some fifty

developing countries provided in this paper tends to reinstate some of the classical themes of development economics --the importance of human capital and the role of markets in development process.

Appendix 1: Definitions of Variables

GR6589: Growth rate of real per capita GDP from 1965 to 1989. Per capita GDP is computed by dividing the GDP figures by the total population. Real GDP (1987 price): BESD IEC National Account, World Bank; Population: BESD Social Indicators. Data on Jordan: GDP current price; GDP deflator: IMF.

IY6589: Real gross domestic investment as a percentage of GDP from 1965 to 1989. Source: real GDI and real GDP: BESD IEC National Account.

HCS65: Human capital stock in 1965 proxied by the estimated average years of schooling of the total labor force; Source: Louat, 1991.

GDP65: Log of real GDP per capita in 1965, GDP65 figures from Summers-Heston data set.

M3Y65: Total assets of the financial system as a percentage of GDP in 1965, where total financial assets is the arithmetic average of the sum of total liquid liabilities (IFS line 551) at year-end and year-beginning data (M31965 is given by (M31964+M31965)/2. The same methodology is applied to all year-end data. GDP in current price: BESD IEC National Account

CY65: Total domestic credit as a percentage of GDP in 1965; total domestic credit includes IMFIFS lines 32an through 32f and 42a through 42e, or lines 52an through 52d where available. Domestic credit is the arithmetic average of the year-end and year-beginning data.

r6589: Real interest rate average from 1965-1989. Real interest rate is given by [((1+nominal rate)/(1+inflation)-1)*100]. Sources: Nominal interest rate (period average): IMFIFS and Alan Gelb; inflation on CPI: IMFIFS.

CBAFA6589: Average for the period 1965-89 of central banks' assets to total assets of the financial system. Source: Central bank assets (end of period): IMFIFS lines 12a through 12f, foreign assets are excluded. Total financial assets: IMFIFS line 551.

BSRCB6589: Average for the period 1965-89 of commercial banks' reserve with the central bank to total assets of the financial system. Sources: Commercial bank reserves (end of period): IMFIFS line 20; GDP in current price: BESD IEC National Account.

DBSRCB: Change in the ratio of commercial bank reserves with the Central Bank to total assets of the financial system. Change is defined as the difference between the average from 1984 to 1989 and the average from 1965 to 1970. Sources: Commercial bank reserves (end of period): IMFIFS line 20; GDP in current price: BESD IEC National Account. The same methodology is applied to other variables in changes: export ratio, DXY, private sector credit, DCPY, govewrnment credit, DCGY, inflation rate, DINF, human capital stock, DHKS, financial depth, DM3Y, financial intermediation, DFI.

FIY6589: Average for the period 1965-89 of financial intermediation to GDP (in %); financial intermediation defined as (M3-M1)/GDP. Sources: Total financial assets (end of period): IMFIFS line 551. M2 was used if data on M3 is not available, IMFIFS lines 34 and 35; GDP: BESD IEC National Account; M1 (end of period): IMFIFS line 34.

CPY6589: The average ratio (in %) of credit to the private sector to GDP for the period 1965-89, given by IMFIFS lines 32d, 42d and 42e or 52d (end-year data).

CGY6589: The average ratio (in %) of credit to the public sector to GDP for the period 1965-89, given by IMFIFS lines 32an through 32c, and 42an through 42c, or 52an through 52c where available (year-end data).

BMP6589: Average for the period 1965-89 of the black market exchange

rate premium over the official exchange rate in percent, defined as (BE-OE)/OE, where BE is black market exchange rate and OE is official exchange rate. Source: International Currency Year book, previously known as Pick's Currency Yearbook.

XY6589: Average for the period 1965-89 of the export to GDP ratio in percent. Sources: foreign trade: IMFIFS; GDP: BESD IEC National Account.

INFL6589: Average of the annual inflation rate on CPI for the period 1965 to 1989. Source: inflation on CPI (period average): IMFIFS.

VINF6589: Variance of inflation from 1965 to 1989. Source: inflation on CPI (period average): IMFIFS.

SEGRY6589: Change in the Central Bank's claims on the public sector (IFS lines 12a, 12b, 12c including the central government and public enterprises), given by the difference in the year-end and begining-year data, as a ratio of GDP in current prices in the same year.

Dr: Dummy variable for real interest rate average from 1965 to 1989, where 1 for positive numbers and 0 for negative numbers.

DA: Dummy variable for Africa, where 1 for African countries and 0 for others.

DLA: Dummy variable for Latin America, where 1 for Latin American countries and 0 for others.

Appendix 2: Mean and Standard Deviation of variables

	Mean	S.D.
No. of Obs.	52	52
GR6589	1.52	1.75
GR7089	1.33	0.72
GDP65	-0.16	0.72
M3Y65	18.54	10.70
CPY65	14.05	8.52
CGY65	4.83	8.17
HKS65	2.66	1.99
CPY6589	21.03	11.02
DCPY	11.22	15.92
CGY6589	9.26	7.72
DCGY	7.71	9.51
BSRCB6589	10.73	7.85
DBSRCP	2.84	10.35
r6589	-3.49	5.21
DR	0.83	0.38
CBAFA6589	50.86	32.45
M3Y6589	25.41	14.13
DM3Y	10.61	15.23
FIY6589	10.74	9.12
DFI	10.21	13.09
IY6589	22.51	7.35
XY6589	24.55	11.49
DXY	4.44	9.63
DHKS	2.17	1.12
INFL6589	22.99	30.62
DINF	30.51	78.46
SEGRY6589	1.89	1.99
BMP6589	58.51	99.57
DBMP	-2.71	343.63
CBAFA6589	50.86	32.44
DCBAFA	31.32	43.93
DA	0.46	0.50
DLA	0.21	0.41

APPENDIX 3: LIST OF COUNTRIES IN SAMPLE

No.	Country code	Country
1	ARG	Argentina
2	BDI	Burundi
3	BEN	Benin
4	BGD	Bangladesh
5	BOL	Bolivia
6	BRA	Brazil
7	CAF	Central African Republic
8	CHL	Chile
9	CIV	Cote d'Ivoire
10	CMR	Cameroon
11	COG	Congo
12	COL	Colombia
13	CRI	Costa Rica
14	DZA	Algeria
15	ECU	Ecuador
16	GAB	Gabon
17	GHA	Ghana
18	GMB	Gambia
19	HND	Honduras
20	IDN	Indonesia
21	JAM	Jamaica
22	JOR	Jordan
23	KEN	Kenya
24	KOR	Korea
25	LKA	Sri Lanka
26	MAR	MOROCCO
27	MDG	Madagascar
28	MEX	Mexico
29	MLI	Mali
30	MRT	Mauritania
31	MUS	Mauritius
32	MWI	MALI
33	MYS	Malaysia
34	NER	Niger
35	NGA	Nicaragua
36	NPL	Nepal
37	PAK	Pakistan
38	PER	Peru
39	PHL	Philippines
40	PNG	Papua New Guinea
41	SEN	Senegal
42	SLE	Sierra Leone
43	SOM	Somalia
44	TGO	Togo
45	THA	Thailand
46	TUN	Tunisia
47	TUR	Turkey
48	TZA	Tanzania
49	URY	Uruguay
50	VEN	Venezuela
51	ZAR	Zaire
52	ZWE	Zimbabwe

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